汕头市众利电子科技有限公司

产品说明书

ZL24064D1

联系地址：广东省汕头市潮阳区平北外经工业村 1-4 楼
联系电话：0754-8724000
传真号码：0754-8729633
电子邮箱：zllcm@zhonglilcm.com
公司网址：www.zhonglilcm.com

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

目 录

(一) 概述

(二) 外形尺寸

(三) 模块结构框图

(四) 模块的外部接口

(五) 指令说明

(六) 电气参数

(七) IC 功能描述

(八) 应用举例

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

一、概述

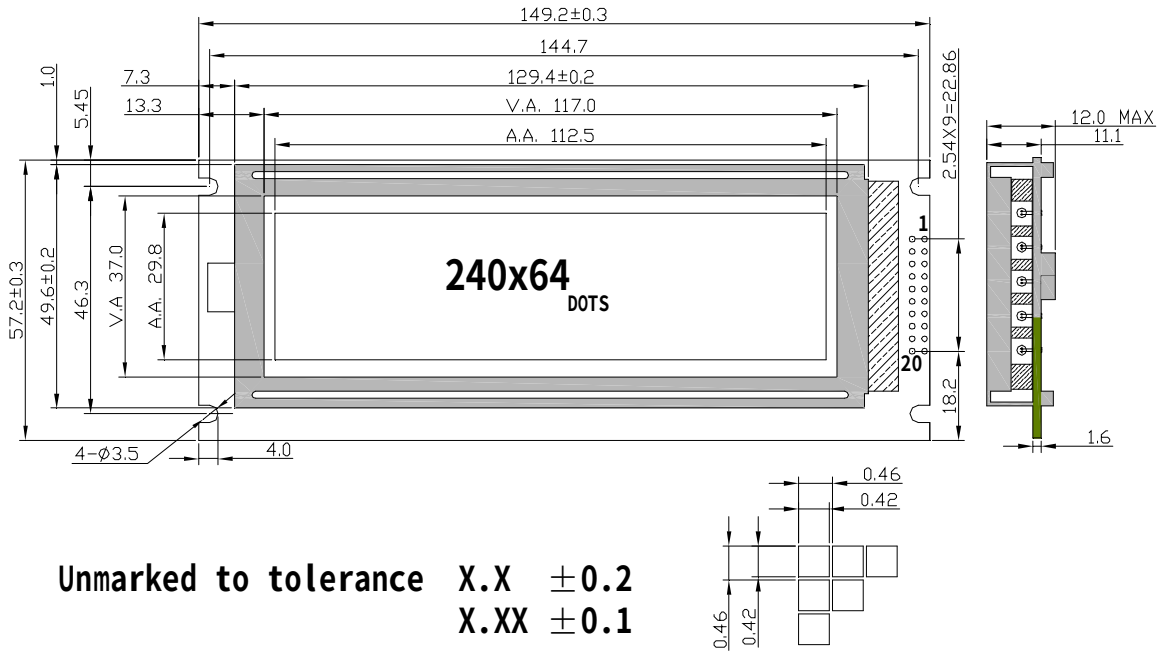
ZL24064D1 是一种图形点阵液晶显示器,它由控制器 T6963C、行驱动器/ 列驱动器及 240×64 全点阵液晶显示器组成.可完成图形显示,也可以显示 15×4 个(16×16 点阵)汉字.

主要技术参数和性能:

1.电源:VDD:+5V±10%; 模块内可自带-10V 负压, 用于 LCD 的驱动电压;
2.显示内容:240(列)×64(行)点;
3.全屏幕点阵;
4.带 8K 外部数据存储器(其地址由软件设定);
5.其接口适配 8080 系列和 Z80 系列 MPU 的控制时序;
6.驱动方式:1/128 DUTY,1/9 BIAS;
7.工作温度: 0℃ ∽ +60℃ ,存储温度: -20℃ ∽ +75℃;
8.模块可带 LED 或 EL 背光;背光电流≤100 mA
9.6 O'CLOCK 显示;

二、外形尺寸图

图 1



Unmarked to tolerance X.X ±0.2
X.XX ±0.1

scale: 15:1

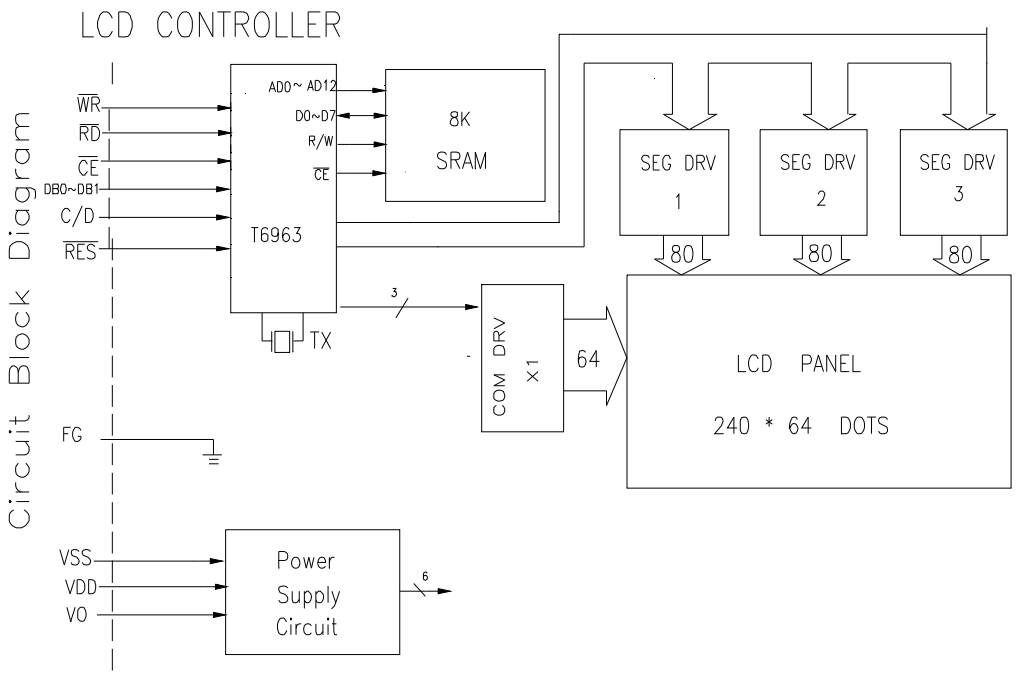
2. 外形尺寸一览

表 1

ITEM	NOMINAL DIMEN	UNIT
模块体积	149.2×57.2×12.0	mm
视域	117.0×37.0	mm
行列点阵数	240×64	DOTS
点距离	0.46×0.46	mm
点大小	0.42×0.42	mm

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

三、硬件结构图



四、模块的外部接口

外部接口信号如下表 2 所示：

表 2

Pin no	Symbol	Level	Function
1	FG	0V	Frame ground
2	Vss	0V	Ground
3	VDD	5.0V	Supply voltage for logic
4	V0	-	Operating voltage for LCD drive
5	/WR	L	Write signal
6	/RD	L	Read signal
7	/CE	L	Chip enable signal
8	C/D	H/L	H: Instruction code L: Data
9	NC	-	No connection
10	/RESET	L	Reset signal
11	DB0	H/L	Data bit 0
12	DB1	H/L	Data bit 1
13	DB2	H/L	Data bit 2
14	DB3	H/L	Data bit 3
15	DB4	H/L	Data bit 4
16	DB5	H/L	Data bit 5
17	DB6	H/L	Data bit 6
18	DB7	H/L	Data bit 7
19	FS	H/L	Font select signal (H:5X8 dots; L:8X8 dots)
20	VOUT	-10V	Negative voltage (-10V) for LCD drive
21	LEDA	H	LED Backlight A(+5.0V)
22	LEDK	L	LED Backlight K(0V)

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

五、IC 说明及指令表

T6963C is LCD controller designed to be used for control LCD driver LCD driver LSIs and display data Memory, It has an 8 bit parallel data bus And control lines for reading or writing through a MPU I/F. It has 128 words character generator ROM with the capability to control External display RAM of up to 128K bytes. Allocation of text, graphics And external generator RAM can be easily made and the display window can Be freely moved within the allocated memory range.

It supports a very board range of LCD formats by selecting different Combinations on a set of programmable inputs. It can be used in text,graphic Modes and has various attribute functions.

指令表：

表 2

COMMAND	CODE	D1	D2	FUNCTION
Register Set	00100001	X address	Y address	Cursor pointer set
	00100010	Data	00H	Off register
	00100100	Low address	High address	Address pointer set
Control Word set	01000000	Low address	High address	Text home address set
	01000001	Columns	00H	Text area set
	01000010	Low address	High address	Graphic home address set
	01000011	Columns	00H	Graphic area set
Mode set	1000x000	-	-	"OR" mode
	1000x001	-	-	"EXOR" mode
	1000x011	-	-	"AND" mode
	1000x100	-	-	"Text attribute" mode
	10000xxx	-	-	Internal CGROM mode
	10001xxx	-	-	External CGRAM mode
Display Mode	10010000	-	-	Display off
	1001xx10	-	-	Cursor on, blink off
	1001xx11	-	-	Cursor on, blink on
	100101xx	-	-	Text on, graphic off
	100110xx	-	-	Text off, graphic on
	100111xx	-	-	Text on, graphic on
Cursor Pattern Select	10100000	-	-	1 line cursor
	10100001	-	-	2 line cursor
	10100010	-	-	3 line cursor
	10100011	-	-	4 line cursor
	10100100	-	-	5 line cursor
	10100101	-	-	6 line cursor
	10100110	-	-	7 line cursor
	10100111	-	-	8 line cursor
Data auto Read/write	10110000	-	-	Data auto write set
	10110001	-	-	Data auto read set
	10110010	-	-	Auto reset
Data read Write	11000000	Data	-	Data write and ADP increment
	11000001	-	-	Data read and ADP increment
	11000010	Data	-	Data write and ADP decrement
	11000011	-	-	Data read and ADP decrement

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

	11000100 11000101	Data -	- -	Data write and ADP no variable Data read and ADP no variable
Screen peek	11100000	-	-	Screen peek
Screen copy	11101000	-	-	Screen copy
Bit Set/Reset	11110XX	-	-	Bit reset
	11111XXX	-	-	Bit set
	1111X000	-	-	Bit 0(LSB)
	1111X001	-	-	Bit 1
	1111X010	-	-	Bit 2
	1111X011	-	-	Bit 3
	1111X100	-	-	Bit 4
	1111X101	-	-	Bit 5
	1111X110	-	-	Bit 6
	1111X111	-	-	Bit 7(MSB)

六、电气参数

1.ABSOLUTE MAXIMUM RATING

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage(logic)	VDD-VSS	-	-0.3	-	7	V
Supply Voltage(LCD Drive)	VDD-VO	-	VDD+0.3	-	VDD-0.3	V
Input Voltage	VI	-	-0.3	-	VDD+0.3	V
Operating Temperature	Topr	-	-10	-	+55	° C
Storage Temperature	Tstg	-	-20	-	+60	° C

2.OPTICAL DATA Ta=25° C

Item	Symbol	Condition		Standard Value			Unit
				min	typ	max	
Supply voltage(Logic)	VDD-VSS	-		4.75	5	5.25	V
Supply voltage(LCD Drive)	VDD-VO	-		-	-	-	V
Supply current	IDD	-		-	12.0	17.0	mA
	IO	-		-	1.8	2.5	mA
EL Backlight current	IEL	-		-	100	-	mA
Input high voltage	VIH	High level		0.7VDD	-	VDD	V
Input low voltage	VIL	Low level		0	-	0.3VDD	V
Supply voltage for LCD Drive (1/80 duty)	VDD-VO	Ta=0° C		14.2	14.5	14.8	V
		Ta=25° C		13.3	13.6	13.9	V
		Ta=50° C		12.3	12.6	12.9	V
Contrast Ratio	CR			-	4	-	-
Viewing Angle	-	CR≥2	θ	-10	-	20	deg
			θ	60	-	120	deg
Response Time (rise)	Tr	Note 1	Ta=25°	-	130	200	ms
Response Time (delay)	Td	Note 2	Ta=25°	-	150	230	ms

NOTE 1: Required time for blackening ratio of segment goes up from 0% to 90% when Wave from is switched from one selected one (θ =10° , Φ=90°)

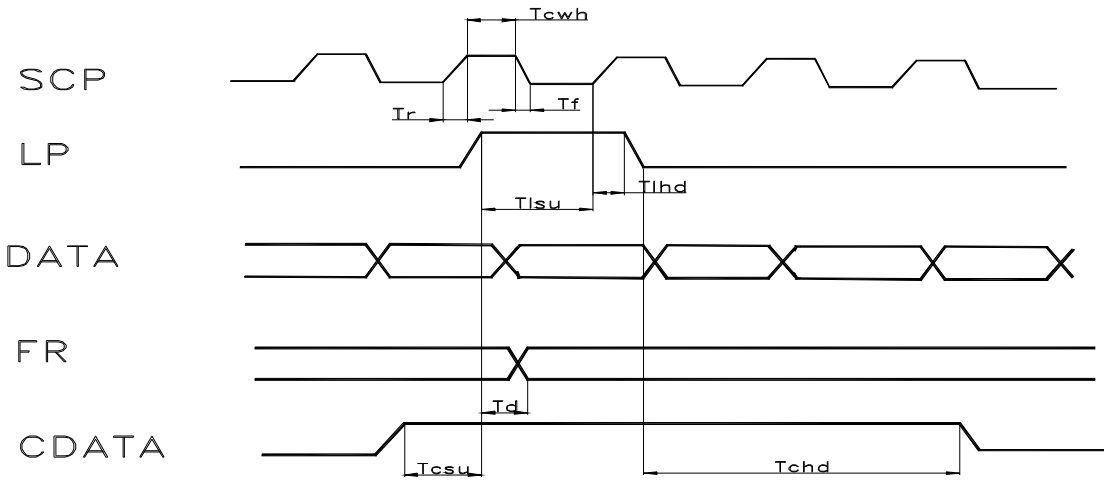
Note 2: Required time for blackening ratio of segment goes down from 100% to 10% When wave from is switched from one selected one (θ =10° , Φ=90°)

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

3.TIMING CHARACTERISICS

Item	Symbol	Min	Max	Unit
Operating frequency	fSCP	-	2.75	MHZ
SCP pulse width	Tcwh, Tcwl	150		ns
SCP rise/fall time	Tr	-	30	ns
LP set up time	Tlsu	150	290	ns
LP hold time	Tlhd	5	40	ns
Data set up time	Tdsu	170	-	ns
Data hold time	Tdhd	80	-	ns
FR delay time	Td	0	90	ns
CDATA set up time	Tcsu	450	850	ns
CDATA hold time	Tchd	450	950	ns

Condition: DV=+5.0V±10%, Ta=-10∽+70° C



驱动波形图

4.INTERFACE TIMING

Item	Symbol	Min	Max	Unit
C/D set up time	Tcds	100	-	ns
C/D hold time	Tcdh	10	-	ns
CE,RD,WR pulse width	Tce,Trd,Twr	80	-	ns
DATA set up time	Tds	80	-	ns
DATA hold time	Tdh	40	-	ns
Access time	Tacc	-	150	ns
Output hold time	Toh	10	50	ns

读写时序图

5.EL Backlight Electrical Characteristics

Ta=25° C VDD=5V

Symbol	Parameter	Min	Type	Max	Units
IIN	VDD supply current	10		150	mA
VA-B	Output voltage across lamp	37	40	43	V
		75	80	85	V
FEL	VA-B output drive frequency	600	800	1000	V
VDD	Supply voltage	4.5		12	V
CL	Load capacitance	0		25	nF
TA	Operating temperature	0		50	° C

Note: EL Backlight with white lamp.

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

七、功能描述

7.1 STATUS READ

Before sending data(read/write),command it is necessary to check the Status.

Status check

Status of T6963c can read from data lines.

/RD L

/WR H

/CE L

C/D H

D0∽D7 Status word

T6963C status word format is following

MSB LSB

STA7	STA6	STA5	STA4	STA3	STA2	STA1	STA0
D7	D6	D5	D4	D3	D2	D1	D0

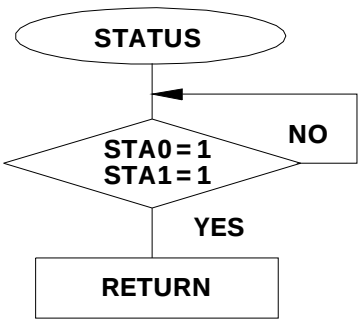
STA0	Check capability of command execution	0:Disable 1:Enable
STA1	Check capability of data read/write	0:Disable 1:Enable
STA2	Check capability of auto mode data read	0:Disable 1:Enable
STA3	Check capability of auto mode data write	0:Disable 1:Enable
STA4	Not use	
STA5	Check capability of controller operation	0:Disable 1:Enable
STA6	Error flag. Using screen peek/copy command	0:No error 1:error
STA7	Check the condition blink	0:Disable 1:Enable

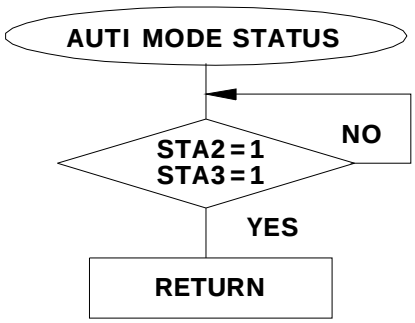
Note 1:It is necessary to check STA0 and STA1 at the same time, The error Is happened by sending data at executing command.

2:The status check will be enough to check STA0/STA1.

3:STA2/STA3 are valid in auto mode STA0/STA1 are invalid.

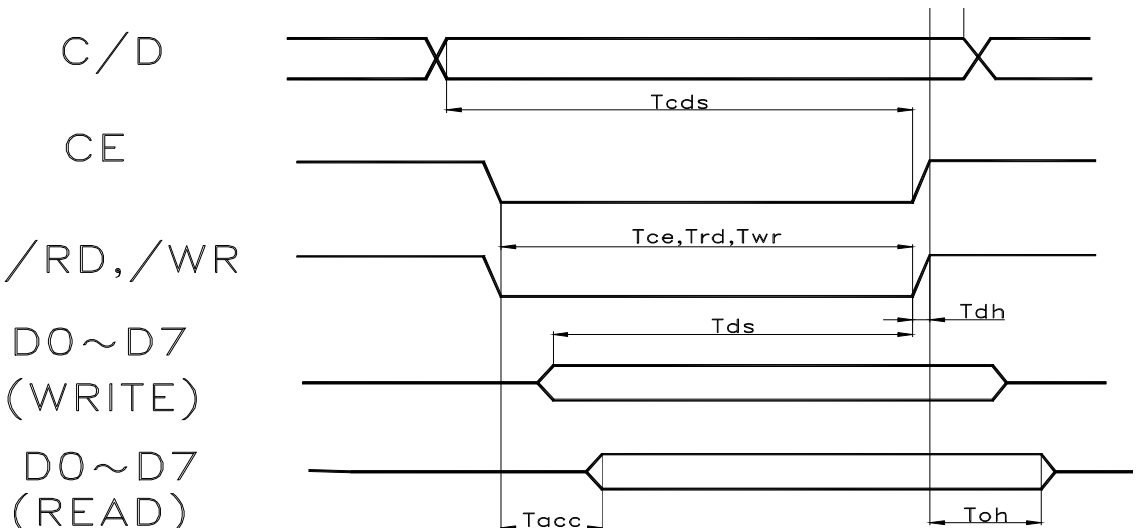
Status checking flow:





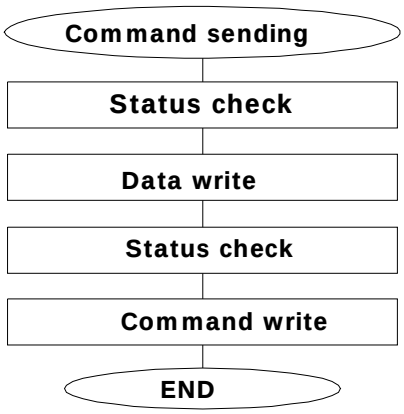
7.2 DATA SET

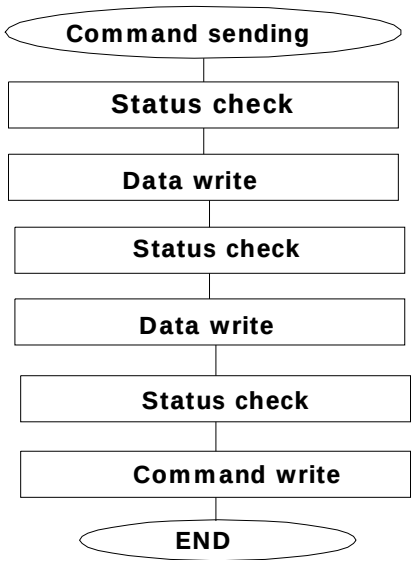
In T6963C,the data have been set and command executes.



PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

The order of procedure of command sending





Note: In case of over 2 data sending,

valid).

7.31 Description of command

1. Register set

CODE	HEX	FUNCTION	D1	D2
00100001	21H	Cursor pointer set	X address	Y address
00100010	22H	Offset register set	Data	00H
00100100	24H	Address pointer set	Low address	High address

(1) Cursor pointer set

The position of cursor is specified by X address. The cursor position Is moved only by this command. The cursor pointer doesn't have the Function of increment and decrement. The shift of cursor set by this Command. X address, Y address are specified following.

X address 00H - - - - 4FH(Low 7bits are valid)

Y address 00H - - - - 1FH(Low 5bits are valid)

1 Screen drive

X address 00H - - - - 4FH

Y address 00H - - - - 0FH

(2) Offset register set

The offset register is used to determine external character generator RAM area.

T6963C has 16 bits address lines as follow:

MSB LSB

Ad15	Ad14	Ad13	Ad12	Ad11	Ad10	Ad9	Ad8	Ad7	Ad6	Ad5	Ad4	Ad3	Ad2	Ad1	Ad0

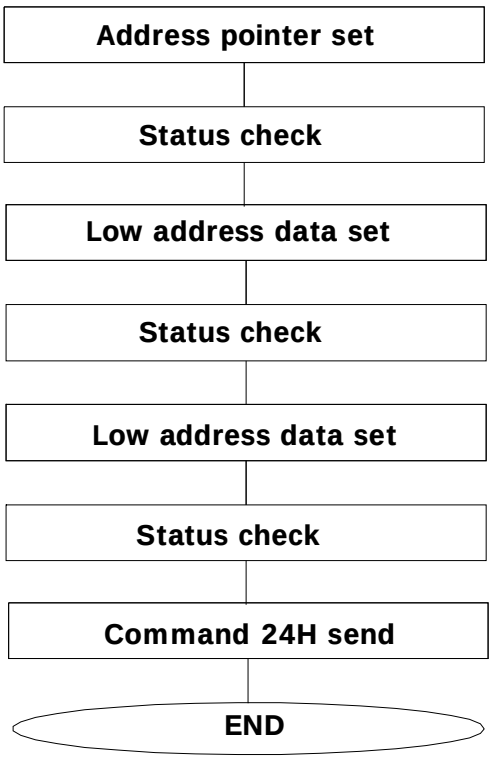
The upper 5 bits (ad15 - ad11) are determined by offset register. The Middle 8 bits (ad10 - ad3) are determined by character code. The Lower 3 bit (ad2 - ad10) are determined by vertical counter. The Lower 5 bit of D1(data) are valid. The data format of external character Generator RAM.

(3) Address pointer set

The address pointer set command is used to indication the start address For writing (or reading) to external RAM.

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

The flow chart address pointer set command



7.32 Control word set

CODE	HEX	FUNCTION	D1	D2
01000000	40H	Text home address set	Low address	High address
01000001	41H	Text area set	Columns	00H
01000010	42H	Graphic home address set	Low address	High address
01000011	43H	Graphic area set	Columns	00H

The home address and column size are defined by this command

(1) Text home address and area set

The starting address of external display RAM for text display is Defined by this command. The text home address shows the left end and Most upper position .

The relationship of external display RAM address and display position

Example:

Text home address: 0000H

Text area: 00A0H

MD2=0, MD3=0: 80 COLUMN

DUAL=0, MDS=1, MD0=1, MD1=0: 28 LINES

Display plane:

0000H	0001H	- - - - -	004EH	004FH	1 Line
00A0H	00A1H	- - - - -	00EEH	00EFH	2 Line
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
10E0H	10E1H	- - - - -	112EH	112FH	28 Lines

(2) Graphic home address and area set

The starting address of external display RAM for Graphic display is Defined by this command. The graphic home address shows the left end most Upper line.

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

The relationship of external display RAM address and display position.
Example:
Graphic home address: 0000H
Graphic area: 0020H
MD2=H, MD3=H: 32 COLUMNS
DUAL=H, MDS=L, MD0=H, MD1=H: 2 LINES
Example:
Display plane:

0000H	0001H	- - - - -	001EH	001FH
0020H	0021H	- - - - -	003EH	003FH
⋮	⋮	⋮	⋮	⋮
01E0H	01E1H		01FEH	01FFH

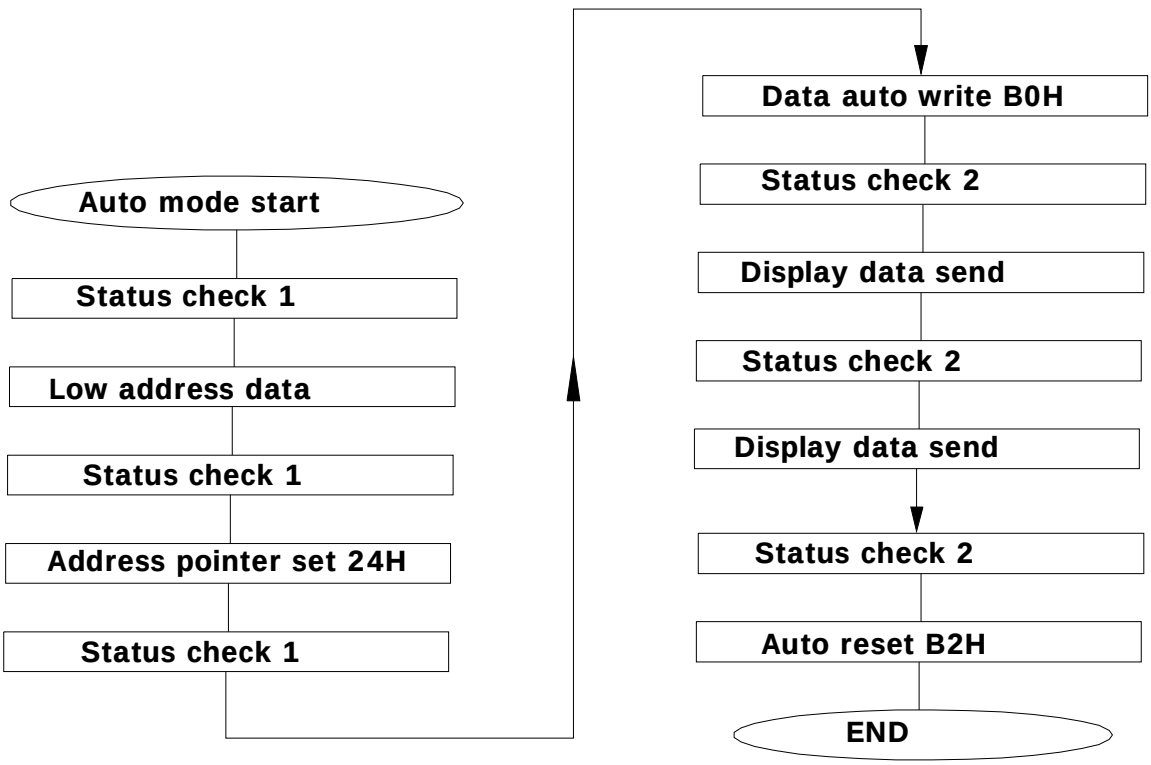
7.33 MODE SET

The display mode is defined by this command. The display mode don't have changed until to send next this command. Logically "OR","EXOR","AND" of text and graphic display can be displayed.
When internal character generator mode is selected, character code 00H - 7FH are selected from built-in character generator ROM. The character code 80H-FFH are automatically selected external character generator RAM.
NOTE: Only text display is attributed, because attributed data is located.
Attribute function
"Reverse display", "Character blink" and "Inhibit" are called "Attribute".The attribute data is written in the graphic area defined by control word set command. The mode set command selects text display only and graphic the mode set command selects text display only and graphic display cannot be displayed. The attribute data of the 1st character in text area Is written at the IST 1 byte in graphic area, and attribute data of n-th 1byte in graphic area. Attribute function is defined as follow.
Attribute RAM 1byte

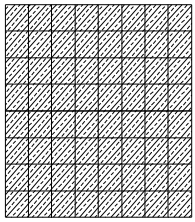
X	X	X	X	D3	D2	D1	D0

X: don't care

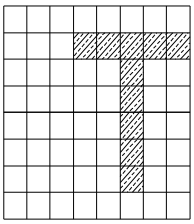
D3	D2	D1	D0	FUNCTION
0	0	0	0	Normal display
0	1	0	1	Reverse display
0	0	1	1	Inhibit display
1	0	0	0	Blink of normal display
1	1	0	0	Blink of reverse display
1	0	1	1	Blink of inhibit display



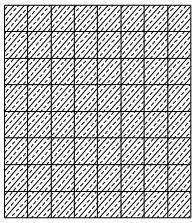
PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn



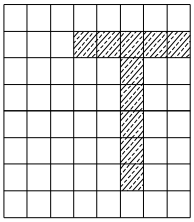
GRAPHIC



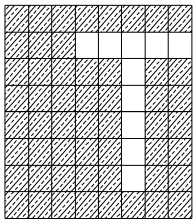
TEXT



"OR"



"AND"



"EXOR"

7.34 DATA AUTO READ/WRITE

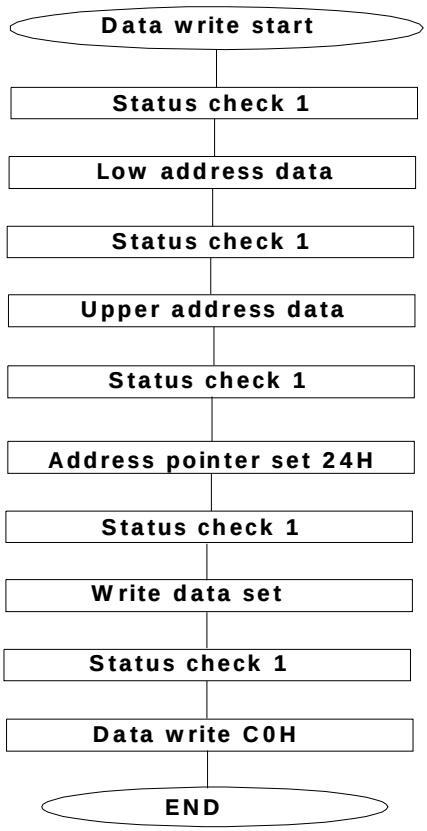
CODE	HEX	FUNCTION	OPERAND
10110000	B0H	Data auto write set	-
10110001	B1H	Data auto read set	-
10110010	B2H	Auto reset	-

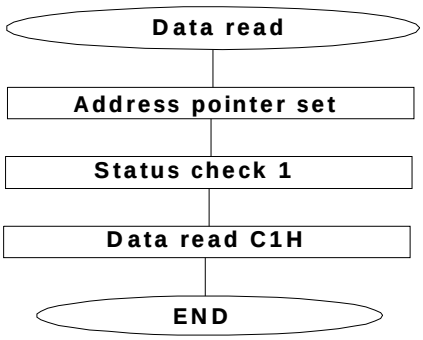
This command is convenient to send full screen data from external display RAM. After setting auto mode , "Data write(or read)" command is not necessary between each data. "Data auto write (or read)" command should follow the "Address pointer set" and address pointer is automatically increment by + 1 after each data. After sending (or receiving) all data "Auto reset" is necessary to return normal operation because all data is regarded "Display data" and no command can be accepted in the auto mode.
Note: status check for auto mode(STA2,STA3 should be checked between each Data. Auto reset should be performed after checking (STA3=1 STA2=1)

7.35 DATA READ WRITE

CODE	HEX	FUNCTION	OPERAND
11000000	C0H	Data write and ADP increment	Data
11000001	C1H	Data read and ADP increment	Data
11000010	C2H	Data write and ADP decrement	Data
11000011	C3H	Data read and ADP decrement	Data
11000100	C4H	Data write and ADP nonvariable	Data
11000101	C5H	Data read and ADP nonvariable	Data

This command is used for data write from MPU to external display RAM, AND data read external display RAM to MPU. Data write/data read should be executed after setting address by address pointer set command. Address Pointer can be automatically increment by setting this command.
Note: this command is necessary for each 1 byte data.
Please refer following flow chart.





PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

NOTE:

(1) After power on, it is necessary to reset. /RESET is kept "L" between 5 CLOCK up(oscillation clock).
(2) When /HALT has been "L", the oscillation is stopped. It is necessary To turn off power supply for LCD, because LCD goes down by DC bias.
(3) The HALF function contains the RESET function.
(4) After state of RESET/HALT.

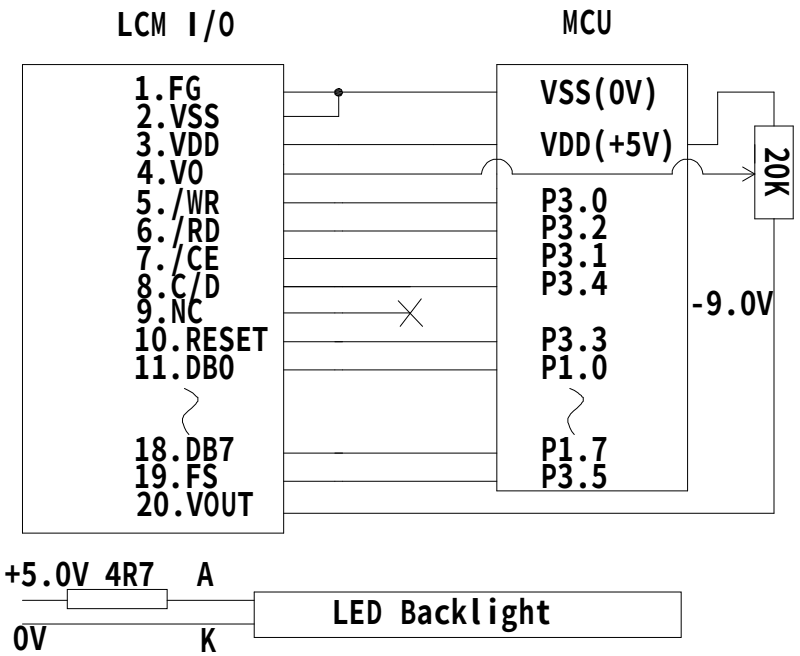
TERMINAL	HALT	RESET
D0-D7	F	F
D0-d7	F	F
R/w	H	H
/ce	H (NOTE 1)	H (NOTE 1)
Ad0-ad15	H (NOTE 2)	H (NOTE 2)
/ce0,/ce1	H (NOTE 1)	H (NOTE 1)
ED,HOD	Final Data	Final Data
HSCP	L	L
LP	L	L
CDATA	H	H
FR	H	H
CH1	L	K0
CH2	L	VEND
DSPON	L	L
XO	H	OSC CLOCK

H: Level H
L: Level L
F: Floating (High impedance)
KO: Internal state (TEXT data access) normally open
VEND: End signal of V-counter(Line count) if MDS=H, T2=L, HEND (end signal of H-count) normally open.
Note 1: In Attribute mode, H or L by state of Graphinc pointer.
Note 2: In Attribute mode, DATA of Graphinc pointer.

八、应用举例

24064D1 与单片机 8031 的一种接口如图.所示:

内置负压电路连接图



PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

```
; driver = T6963C      (TOSHIBA)
; for    24064 LCD module!
R            EQU         P3.2
W            EQU         P3.0
CE           EQU         P3.1
CD          EQU         P3.4
RESET      EQU         P3.3
FS1          EQU         P3.5
SW           EQU         P2.0
;table      equ          0500h
TXHOME     EQU          40H
TXAREA     EQU          41H
GRHOME     EQU          42H
GRAREA     EQU          43H
OFFSET     EQU          22H
ADPSET     EQU          24H
AWRON      EQU          0B0H
AWROFF     EQU          0B2H
            ORG          0000H
            AJMP         START
            ORG          000BH
            AJMP         TIME
            ORG          0030H
TIME:
            MOV          TL0,#00H
            MOV          TH0,#0B2H
            RETI
START:
            MOV          SP,#40H
            MOV          PSW,#00H
            CLR          RESET
            NOP                                  ; five clocks up
            SETB         RESET
;-------------------------------------------------
; display size: 240 columns x 8 (64dots) lines
; character font: select by fs1      6x8 font
;-------------------------------------------------
            CLR          CE
            CLR          FS1
            MOV          DPTR,#0000H          ;text home address
            LCALL        WD2
            MOV          A,#TXHOME
            LCALL        WC
            MOV          DPTR,#0028H     ;set text area 240 segments = #30d columns
            LCALL        WD2
            MOV          A,#TXAREA
            LCALL         WC
            MOV          DPTR,#8000H           ;graphic home address
            LCALL        WD2
            MOV          A,#GRHOME
            LCALL        WC
            MOV          DPTR,#001EH          ;set graphic area     30 columns
            LCALL        WD2
            MOV          A,#GRAREA
            LCALL        WC
            MOV          A,#80h                 ;mode set : inter cg ram, or
            LCALL        WC
            MOV          DPTR,#0002H          ; set offset register
            LCALL        WD2
```


PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

```
        MOV     A,#OFFSET
        LCALL   WC
        MOV     A,#0A0H             ;1-line cursor
        LCALL   WC
        MOV     A,#0C0H
        LCALL   WC
;---------------------------------------------------------------
        LCALL   CLMAP
        LCALL   CLEAR
MAIN:
        SETB    FS1
        MOV     A,#94H              ; text mode
        LCALL   WC
        MOV     DPTR,#0000H         ; 0 lines 0 column
        LCALL   WD2
        MOV     A,#ADPSET
        LCALL   WC
        MOV     A,#AWRON
        LCALL   WC
        MOV     R2,#0A0H
        MOV     DPTR,#TAB1
TEXT1:
        MOV     A,#00h
        MOVC    A,@A+DPTR
        LCALL   AWD
        INC     DPTR
        DJNZ    R2,TEXT1
        LCALL   CH_STA2
        MOV     A,#AWROFF
        LCALL   WC

        MOV     DPTR,#00A0H         ; 3 lines 0 column
        LCALL   WD2
        MOV     A,#ADPSET
        LCALL   WC
        MOV     A,#AWRON
        LCALL   WC
        MOV     R2,#0A0H
        MOV     DPTR,#TAB2
MATRIX:
        MOV     A,#00h
        MOVC    A,@A+DPTR
        LCALL   AWD
        INC     DPTR
        DJNZ    R2,MATRIX
        LCALL   CH_STA2
        MOV     A,#AWROFF
        LCALL   WC
        LCALL   WAIT
;-----------------------------------------
        LCALL   CLEAR
        MOV     A,#98H              ; graphic mode
        LCALL   WC
        CLR     FS1
        LCALL   SCREEN_1
        LCALL   WAIT
        AJMP    MAIN
;-----------------------------------------------
screen_1:
```


PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

```
        MOV         DPTR,#8000H
        LCALL       WD2
        MOV         A,#ADPSET
        LCALL       WC
        MOV         A,#AWRON
        LCALL       WC
            MOV         DPTR,#TABLE1
        MOV         R1,#40H
GRAPH_1:
        MOV         R0,#1EH
GRAPHA:
        CLR         A
        MOVC        A,@A+DPTR
        LCALL       AWD
        INC         DPTR
            DJNZ        R0,GRAPHA
            DJNZ        R1,GRAPH_1
        LCALL       CH_STA2
        MOV         A,#AWROFF
        LCALL       WC
        RET
;-------------subroutine----------------
DPTDEC:
            MOV         A,DPL
            CLR         C
            SUBB        A,#20H
            MOV         DPL,A
            MOV         A,DPH
            SUBB        A,#00H
            MOV         DPH,A
            RET
;-------------subroutine-----------------
WD2:
            MOV         A,DPL
            LCALL       WD1
            MOV         A,DPH
            LCALL       WD1
            RET
WDD2:
            MOV         A,R4
            LCALL       WD1
            MOV         A,R3
            LCALL       WD1
            RET
AWD:
            PUSH        Acc
            LCALL       CH_STA2
            CLR         CD
            POP         Acc
            CLR         W
            MOV         P1,A
            NOP
            NOP
            SETB        W
            SETB        CD
            RET
;-----------------------------------
WD1:
            PUSH        Acc
```


PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

```
        ACALL   CH_STA1
        CLR     CD
        POP     Acc
        CLR     W
        MOV     P1,A
        NOP
        NOP
        SETB    W
        SETB    CD
        RET
;-----------------------------------
WC:
        PUSH    ACC
        LCALL   CH_STA1
        SETB    CD
        POP     Acc
        CLR     W
        MOV     P1,A
        NOP
        NOP
        SETB    W
        SETB    CD
        RET
;---------------------------------------
CH_STA2:
        SETB    CD
        MOV     P1,#0FFH
        CLR     R
        NOP
        NOP
        SETB    R
        MOV     A,P1
        ANL     A,#08H
        CJNE    A,#08H,CH_STA2
        RET
;---------------------------------------
CH_STA1:
        SETB    CD
        MOV     P1,#0FFH
        CLR     R
        NOP
        NOP
        SETB    R
        MOV     A,P1
        ANL     A,#03H
        CJNE    A,#03H,CH_STA1
        RET
;---------------------------------------
DELAY_10ms:
        PUSH    01H
        PUSH    00H
        MOV     R0,#0FFH
DLY:
        MOV     R1,#0FAH
DELY:
        DJNZ    R1,DELY
        DJNZ    R0,DLY
        POP     00H
        POP     01H
```


PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

```
        RET
;---------------------------------------------------
WAIT:
        SETB    P2.0
        MOV     C,P2.0
        JC      WAIT
        LCALL   DELAY_10ms
        SETB    P2.0
        MOV     C,P2.0
        JC      WAIT
HERE:
        SETB    P2.0
        MOV     C,P2.0
        JNC     HERE
        RET
DELAY_1s:
        PUSH    02H
        MOV     R2,#014H
DELL:
        ACALL   DELAY_10ms
        DJNZ    R2,DELL
        POP     02H
        RET
;---------------------------------------------------
DELAY:                                  ;50us
        PUSH    07H
        MOV     R7,#0FFH
LAY:
        DJNZ    R7,LAY
        POP     07H
        RET
;---------------------------------------------------
CLEAR:
        MOV     DPTR,#0000H     ; set address pointer
        LCALL   WD2
        MOV     A,#ADPSET
        LCALL   WC
        MOV     A,#AWRON            ; set data auto write
        LCALL   WC
        MOV     DPTR,#0000h
CLEA:
        MOV     A,#00H              ; clear screen data
        LCALL   AWD                 ; write blank code
        INC     DPTR
        MOV     A,DPH
        CJNE    A,#01,CLEA
        MOV     A,DPL
        CJNE    A,#0E0H,CLEA
        LCALL   CH_STA2
        MOV     A,#AWROFF
        LCALL   WC
        RET
;-------------------------------------
CLMAP:
        MOV     DPTR,#8000H     ; set Address pointer
        LCALL   WD2
        MOV     A,#ADPSET
        LCALL   WC
        MOV     A,#AWRON
```


PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

```
        LCALL   WC
        MOV     DPTR,#8000H
OFF:
        MOV     A,#00H
        LCALL   AWD
        INC     DPTR
        MOV     A,DPH
        CJNE    A,#87H,OFF
        MOV     A,DPL
        CJNE    A,#80H,OFF
        LCALL   CH_STA2
        MOV     A,#AWROFF
        LCALL   WC
        RET
TAB1:

DB  21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H
DB  21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H,21H
DB  22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H
DB  22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H,22H
DB  23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H
DB  23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H,23H
DB  24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H
DB  24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H,24H
TAB2:
DB  25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H
DB  25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H,25H
DB      26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H
DB      26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H,26H
DB  27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H
DB  27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H,27H
DB  28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H
DB  28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H,28H

TABLE1:
;--   调入了一幅图像：E:\测试程序(新)\24064\T6963C\24064-2.bmp    --
;--   宽度 x 高度=240x64    --
DB  0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH
DB  0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,080H,000H
DB  000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB  000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,001H,080H,000H,000H,000H
DB  000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB  000H,000H,000H,000H,000H,000H,000H,000H,000H,001H,080H,000H,000H,000H,000H,000H
DB  000H,000H,000H,000H,000H,000H,000H,000H,000H,003H,000H,000H,000H,000H,000H,000H
DB  000H,000H,000H,001H,080H,000H,000H,001H,080H,000H,000H,000H,000H,000H,000H,000H
DB  000H,000H,000H,000H,000H,0E0H,038H,003H,080H,0E0H,000H,007H,000H,000H,018H,003H
DB  000H,039H,080H,000H,000H,001H,080H,00EH,000H,000H,01EH,007H,000H,038H,000H,000H
DB  000H,018H,003H,0E0H,030H,003H,080H,0C0H,000H,00EH,000H,003H,0FBH,0FFH,080H,071H
DB  080H,01FH,0FFH,0F9H,080H,01CH,000H,000H,0FCH,006H,000H,030H,000H,00FH,0FFH,0F8H
DB  03FH,000H,030H,003H,080H,0C0H,000H,00CH,003H,083H,03BH,003H,000H,061H,080H,000H
DB  000H,031H,080H,01EH,000H,01FH,0E0H,0C6H,000H,030H,000H,000H,000H,070H,003H,007H
DB  030H,003H,080H,0C0H,01FH,0FFH,0FFH,0C3H,033H,003H,000H,0E0H,0C0H,000H,000H,031H
DB  080H,03BH,000H,000H,060H,0E6H,000H,030H,000H,000H,000H,0C0H,003H,003H,030H,003H
DB  0B0H,0C7H,000H,018H,000H,003H,033H,003H,000H,0C0H,0C0H,000H,000H,031H,080H,033H
DB  080H,000H,060H,0E6H,01FH,0FFH,0F0H,000H,001H,080H,003H,003H,030H,01FH,0FFH,0FCH
DB  000H,038H,000H,003H,063H,0FFH,001H,0C0H,060H,000H,007H,031H,080H,061H,0C0H,000H
DB  060H,0E6H,018H,030H,060H,000H,01FH,000H,003H,030H,030H,003H,080H,0C0H,000H,030H
DB  018H,003H,063H,003H,001H,080H,070H,03FH,0FCH,031H,080H,0C0H,0E0H,000H,067H,0E6H
DB  018H,030H,060H,000H,01CH,000H,03FH,0E0H,030H,003H,080H,0C0H,000H,07FH,0FCH,003H
DB  0C3H,003H,003H,00CH,038H,000H,000H,031H,081H,080H,070H,01FH,0FCH,0E6H,018H,030H
DB  060H,000H,00CH,000H,003H,00CH,030H,003H,080H,0C0H,000H,0E0H,018H,003H,063H,003H
DB  006H,00EH,01EH,000H,000H,031H,087H,000H,0FEH,000H,0E0H,0E6H,018H,030H,060H,000H
DB  00CH,00EH,007H,006H,030H,003H,0FFH,0FEH,001H,0E0H,018H,003H,033H,0FFH,00CH,01CH
DB  00FH,00FH,0FEH,031H,09DH,0C0H,0EEH,001H,0E0H,0E6H,01FH,0FFH,0E0H,07FH,0FFH,0FEH
DB  007H,0E3H,030H,003H,0C6H,00CH,003H,060H,018H,003H,01BH,066H,018H,01CH,000H,00CH
DB  00CH,031H,081H,0C0H,0C0H,001H,0F8H,0E6H,018H,030H,060H,000H,00CH,000H,00FH,0F3H
```

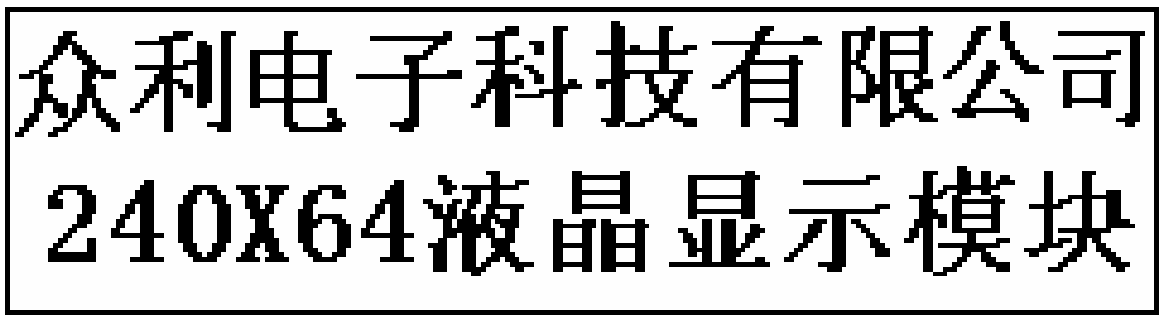

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

```
DB   036H,01FH,086H,01CH,006H,07FH,0F8H,003H,01BH,063H,080H,038H,000H,00CH,00CH,031H
DB   081H,080H,0E0H,003H,06EH,0E6H,018H,030H,060H,000H,00CH,000H,00FH,0B0H,03FH,01BH
DB   083H,018H,01CH,060H,018H,003H,01FH,067H,080H,030H,000H,00CH,00CH,031H,081H,080H
DB   0E0H,007H,066H,0E6H,018H,030H,060H,000H,00CH,000H,01BH,081H,0F8H,003H,083H,038H
DB   000H,060H,018H,003H,01FH,03EH,000H,061H,080H,00CH,00CH,031H,081H,0C1H,0E0H,006H
DB   066H,0E6H,018H,030H,060H,000H,00CH,000H,033H,0BFH,030H,003H,081H,0B0H,000H,060H
DB   018H,003H,0FBH,038H,000H,0E0H,0C0H,00CH,00CH,031H,083H,0E1H,0B0H,00CH,060H,0E6H
DB   01FH,0FFH,0E0H,000H,00CH,000H,033H,080H,030H,003H,081H,0F0H,000H,07FH,0F8H,003H
DB   073H,038H,000H,0C0H,060H,00FH,0FCH,031H,083H,039H,0B0H,018H,060H,0C6H,018H,030H
DB   000H,000H,00CH,000H,063H,080H,030H,003H,080H,0E0H,000H,060H,018H,003H,003H,01CH
DB   001H,080H,030H,00CH,00CH,031H,083H,03BH,098H,030H,060H,006H,000H,030H,018H,000H
DB   00CH,000H,003H,080H,030H,003H,081H,0E0H,000H,060H,018H,003H,003H,03EH,007H,0FFH
DB   0F8H,000H,000H,031H,086H,01BH,01CH,000H,060H,006H,000H,030H,018H,000H,00CH,000H
DB   003H,080H,030H,003H,083H,038H,000H,060H,018H,003H,003H,0E7H,083H,0C0H,038H,000H
DB   000H,071H,08EH,006H,00EH,000H,060H,006H,000H,030H,00CH,000H,01CH,000H,003H,080H
DB   030H,00FH,08EH,01FH,000H,060H,0F8H,003H,003H,083H,0C0H,000H,018H,000H,001H,0F1H
DB   08CH,00CH,007H,000H,060H,03EH,000H,038H,01EH,000H,0FCH,000H,003H,080H,030H,007H
DB   078H,007H,000H,060H,038H,003H,003H,000H,000H,000H,000H,000H,000H,061H,098H,038H
DB   003H,000H,060H,00EH,000H,01FH,0FCH,000H,038H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,001H,0B0H,060H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,001H,080H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,001H,080H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,001H,080H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,001H,080H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,001H,080H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,001H
DB   080H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,001H,080H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,003H,000H,000H,000H,000H,001H,080H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,00EH,000H,003H,000H,0C0H,000H,000H,030H
DB   000H,000H,000H,001H,0C3H,098H,000H,0C0H,0E0H,001H,080H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,030H,006H,000H,003H,0FFH,0C0H,003H,0FFH,0F8H,000H,000H
DB   01CH,001H,083H,099H,080H,0C0H,0C0H,001H,080H,000H,000H,006H,000H,000H,000H,000H
DB   000H,000H,060H,038H,006H,038H,003H,000H,0C0H,003H,000H,070H,003H,0FFH,0F0H,001H
DB   083H,09BH,0C0H,0C0H,0C0H,001H,080H,01FH,080H,00EH,001H,0F0H,0FBH,0E0H,07CH,000H
DB   0E0H,01DH,0FFH,0E0H,003H,000H,0C0H,003H,000H,070H,000H,000H,000H,001H,09FH,0FEH
DB   000H,0C0H,0C0H,001H,080H,031H,0C0H,01EH,003H,0B8H,071H,0C1H,0CEH,001H,0E0H,018H
DB   066H,000H,003H,0FFH,0C0H,003H,000H,070H,000H,000H,000H,001H,0B3H,098H,000H,0C0H
DB   0C7H,001H,080H,060H,0E0H,01EH,007H,01CH,039H,083H,08EH,001H,0E0H,000H,066H,000H
DB   003H,000H,0C0H,003H,0FFH,0F0H,000H,000H,000H,00FH,0E6H,006H,000H,0C7H,0FFH,001H
DB   080H,070H,0E0H,03EH,007H,01CH,039H,083H,080H,003H,0E1H,086H,0E6H,000H,003H,000H
DB   0C0H,003H,000H,070H,000H,000H,000H,003H,087H,0FFH,000H,0DCH,0C7H,001H,080H,070H
DB   0E0H,06EH,00EH,00EH,03BH,003H,000H,006H,0E0H,0ECH,0CFH,0F0H,003H,0FFH,0C0H,003H
DB   000H,070H,000H,000H,007H,003H,086H,006H,007H,0F0H,0C7H,001H,080H,000H,0E0H,06EH
DB   00EH,00EH,01FH,007H,000H,006H,0E0H,06DH,08CH,060H,003H,000H,0C0H,003H,0FFH,0F0H
DB   01FH,0FFH,0FCH,003H,0C6H,006H,000H,0C0H,0C7H,001H,080H,001H,0C0H,0CEH,00EH,00EH
DB   01EH,007H,07CH,00CH,0E0H,07DH,0DEH,060H,000H,000H,000H,003H,000H,070H,000H,00EH
DB   000H,003H,0F7H,0FEH,000H,0C0H,0C7H,001H,080H,001H,0C1H,08EH,00EH,00EH,00EH,007H
DB   0CEH,018H,0E0H,01BH,0DBH,0E0H,030H,0ECH,018H,000H,067H,000H,000H,0EEH,0C0H,007H
DB   0B6H,006H,000H,0C0H,0C7H,0C1H,080H,003H,081H,08EH,00EH,00EH,00EH,007H,087H,018H
DB   0E0H,01BH,0F9H,0E0H,03FH,0EFH,0FCH,000H,067H,018H,001H,0CEH,060H,007H,0B6H,006H
DB   000H,0C0H,0C7H,0E1H,080H,006H,003H,00EH,00EH,00EH,00FH,007H,007H,030H,0E0H,01FH
DB   0FCH,0C0H,030H,0CEH,018H,00CH,067H,01CH,001H,0CEH,030H,00DH,087H,0FEH,000H,0DFH
DB   0FCH,001H,080H,00CH,003H,0FFH,08EH,00EH,01FH,007H,007H,03FH,0F8H,01DH,0ECH,0C0H
DB   030H,0CEH,018H,006H,067H,038H,003H,08EH,018H,00DH,080H,0C0H,000H,0C1H,0F0H,001H
DB   080H,018H,060H,00EH,00EH,00EH,01FH,087H,007H,000H,0E0H,031H,0C7H,0C0H,030H,0CEH
DB   018H,007H,067H,030H,003H,00EH,00CH,019H,080H,0C3H,080H,0DDH,0B0H,001H,080H,030H
DB   060H,00EH,007H,01CH,03BH,083H,007H,000H,0E0H,0F1H,0C7H,080H,03FH,0CFH,0F8H,003H
DB   067H,060H,006H,00EH,00EH,001H,0BFH,0FEH,001H,0F1H,098H,001H,080H,060H,060H,00EH
DB   007H,01CH,033H,083H,086H,000H,0E0H,071H,0C3H,080H,030H,0CEH,018H,003H,0E7H,0C0H
DB   00CH,00EH,007H,001H,081H,0F0H,00FH,083H,09CH,001H,080H,07FH,0E0H,00EH,003H,0B8H
DB   071H,0C1H,0CEH,000H,0E0H,071H,0C7H,0C0H,030H,0CEH,018H,003H,067H,080H,018H,00EH
DB   007H,001H,081H,098H,006H,007H,00EH,001H,080H,07FH,0E0H,03FH,081H,0F0H,0FBH,0E0H
```


PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn

```
DB   0F8H,003H,0F8H,071H,0CEH,0E0H,030H,0CEH,018H,000H,067H,00CH,030H,00EH,000H,001H
DB   083H,01CH,000H,00EH,007H,001H,080H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,071H,0D8H,07CH,03FH,0CFH,0F8H,03FH,0FFH,0FEH,000H,07EH,000H,001H,086H,00FH
DB   080H,018H,003H,0C1H,080H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,071H
DB   0F0H,030H,030H,0CEH,018H,000H,000H,000H,000H,01CH,000H,001H,09CH,003H,080H,070H
DB   001H,081H,080H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,060H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,070H,000H,000H,000H,000H,001H
DB   080H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,001H,080H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,001H,080H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,001H,080H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,001H,080H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,001H,080H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,001H,080H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H
DB   000H,001H,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH
DB   0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH
                                    END
```

显示内容为：



制订：PETER.　　日期：2007 年 8 月.　　版本：A.

PDF 文件使用 "pdfFactory Pro" 试用版本创建 www.fineprint.com.cn